4) Remarks/Argument

A favorable reconsideration of the above-identify application is requested in view of the following remarks.

The Applicant disagrees with the examiner on the rejection under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,825,827 hereinafter Yang, in view of U.S. Patent No. 6,336,317 B1, hereinafter Holtzapple, because;

1) Yang disclosed a Cogeneration Thermal System as a group, of machines, engines and apparatus, with one or more common purposes.
This invention is different since:
It is an Engine or thermal primer mover; a device for transforming heat energy into mechanical energy and uses it to make something move.

2) Yang in a Brayton-Rankine System replaced the combustor and expander in Brayton Engine and replaced the expander in Rankine Engine.
This invention is different since:
It is one internal combustion engine with one open-closed cycle with a binary fluid, air in open cycle and water in closed cycle. These separate fluids, are used mixed with each other, one superimposed upon and augmenting the performance of the other.

3) Yang disclosed a Shaft Power Generator with load control by fuel regulation. All parameters of the thermal cycles are variable with the load.

This invention is different since:

It is an engine with maximum-constant peak temperature. The peak temperature in an engine is the temperature of the fluid at the beginning of the expansion process. All parameters of the thermal cycles are constant with the load.

4) Yang disclosed a combustion process at constant volume.

This invention is different since:

It is an engine with combustion process at constant pressure.

5) Yang disclosed a Cogeneration Thermal System with two cycles, two expanders and two power shafts.

This invention is different since:

It is one cycle, two expanders and one power shaft.

6) Yang disclosed a Cogeneration Thermal System with internal cooling in the internal combustion engine for preheating water for the recuperative boiler in Rankine Engine.

This invention is different since:

It is an internal combustion engine with internal cooling for a large recuperative steam generation.

7) Yang disclosed a Cogeneration Thermal System with steam generation for the Rankine Engine in a recuperative boiler heating by exhaust gasses from the internal combustion engine without a second combustor.

This invention is different since:

It is one internal combustion engine with internal cooling for a recuperative steam generation, without boiler, and with steam injection in hot gasses going to a second combustor.

8) Yang disclosed a compressor and expander of positive displacement without volume reduction for combustion at constant volume in a Cogeneration Thermal System.

This invention is different since:

It is a compressor and two expanders of positive displacement by volume variation,

9) Holtzapple disclosed a piston engine with an Open Brayton Cycle with a minimal water injection due to the destructive consequences. The water consumption is 100 % of the injected water.

This invention is different since:

It is an engine with one Open-Closed Cycle with maximum water injection because the twin screw compressor allows the liquid pumping. The water consumption is zero because the exhaust vapor is liquefied by the removal of heat.

10) Holtzapple disclosed a turbine engine with a minimal water injection due to the destructive consequences or turn off flame in the combustor. The water consumption is 100 % of the injected water.
This invention is different since:
It is an engine with a maximum water injection because the twin screw compressor allows the liquid pumping. The water consumption is zero because the exhaust vapor is liquefied by the removal of heat.

11) Holtzapple disclosed a turbine engine with an Open Brayton Cycle and water injection in the air aspired by a gerotor compressor, but this type of apparatus requires lubrication due to the high friction among the parts in movement.
This invention is different since:
It uses a water-injection twin screw compressor, oil-free and without contact among the moving parts.

There are other arguments to demonstrate the originality of this invention:

The open-closed cycles and binary fluids are usual terms in Heating, Refrigerating and Air Conditioning, but are unusual terms in internal combustion engine because this invention is the only internal combustion engine of open-closed cycle and binary fluid.

It is more efficient than any other known combustion engine.

It is the cleanest known internal combustion engine.